

Estimating primary production from continuous oxygen data in the Schelde Estuary

Meire Alexander¹, Tom Maris¹, Tom Cox^{1,3} and Lieven Bervoets⁴

¹ ECOBE, Universiteit Antwerpen, Campus Drie Eiken, Universiteitsplein 1, B-2610 Wilrijk, Belgium
E-mail: Alexander.Meire@student.ua.ac.be

³ Netherlands Institute for Ecology (NIOO-KNAW), Centre for Estuarine and Marine Ecology, Korringaweg 7, 4400 AC Yerseke, the Netherlands

⁴ EB&T, Universiteit Antwerpen, Middelheimcampus, Groenenborgerlaan 171, B-2020 Antwerpen, Belgium

Industrial and agricultural pollution in the 20th century transformed the upper part of the Schelde Estuary into a hostile environment. Fortunately, due to waste water treatment, this trend has been reversed and several species now recolonize their former habitat. In order to understand and protect the oligohaline and freshwater reaches, long term monitoring campaigns started from the mid 1990's. Besides these monthly sampling campaigns, Universiteit Antwerpen installed a continuous data logger for oxygen, temperature, pH, turbidity, salinity, conductivity and recently NO_3 and NH_4 . These continuous data could illuminate short term fluctuations in water quality such as peak events that are missed with monthly sampling techniques. Furthermore, based on continuous oxygen data, estimates of gross primary production (GPP) can be made. In estuarine systems, oxygen data typically exhibit a complex wave function. We can split this wave function into basic sine functions of different frequencies by performing a Fast Fourier Transform. The sine function with a 24h periodicity will approximate GPP since GPP is the main process with a diurnal periodicity. Compared to the labour intensive ^{14}C -incorporation method, our approach avoids "bottle effects" because oxygen levels reflect the real GPP.